2013

Test 2065: Kubota M9960

Nebraska Tractor Test Laboratory
University of Nebraska-Lincoln, tractortestlab@unl.edu

NEBRASKA TRACTOR TEST 2065
KUBOTA M9960 DIESEL
24 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—637 rpm)					
91.03 *(67.88)*	2601	5.68 *(21.49)*	0.437 *(0.266)*	16.03 *(3.16)*	Fuel used during active exhaust regeneration - 0.07 gal *(0.26 l)* (see note 1 p.2)
Standard Power Take-off Speed(540 rpm)					
86.90 *(64.80)*	2205	5.05 *(19.12)*	0.407 *(0.248)*	17.21 *(3.39)*	
VARYING POWER AND FUEL CONSUMPTION					
91.03 *(67.88)*	2601	5.68 *(21.49)*	0.437 *(0.266)*	16.03 *(3.16)*	Air temperature
79.06 *(58.96)*	2656	5.13 *(19.42)*	0.455 *(0.277)*	15.41 *(3.04)*	73°F *(23°C)*
59.93 *(44.69)*	2686	4.25 *(16.08)*	0.497 *(0.302)*	14.10 *(2.78)*	Relative humidity
40.36 *(30.09)*	2714	3.45 *(13.05)*	0.598 *(0.364)*	11.71 *(2.31)*	50%
20.32 *(15.15)*	2739	2.59 *(9.79)*	0.892 *(0.543)*	7.86 *(1.55)*	Barometer
2.12 *(1.58)*	2765	1.73 *(6.54)*	5.700 *(3.467)*	1.23 *(0.247)*	28.74"Hg *(97.33 kPa)*

Maximum torque - 229 lb.-ft. *(310 Nm)* at 1503 rpm
Maximum torque rise - 24.6%
Torque rise at 2080 rpm - 16%

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Front Wheel Drive Disengaged dB(A)
At no load in 10th(HL5) gear	79.7	79.1
Bystander in 23th(HH5) gear	---	80.8

TIRES AND WEIGHT	Tested without ballast
Rear Tires–No., size, ply & psi *(kPa)*	Two 18.4-30; 8; 16 *(110)*
Front Tires–No., size, ply & psi *(kPa)*	Two 12.4-24; 8; 16 *(110)*
Height of Drawbar	19.5 in *(495 mm)*
Static Weight with operator– Rear	4070 lb *(1846 kg)*
– Front	2650 lb *(1202 kg)*
– Total	6720 lb *(3048 kg)*

Location of tests: Nebraska Tractor Test Laboratory, University of Nebraska, Lincoln Nebraska 68583-0832
Dates of tests: June 6 - 13, 2013

Manufacturer: Kubota Tsukuba Plant 10, Sakano-Shinden, Tsukuba-Mirai-City, Ibaraki, 300-2402 Japan

FUEL, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CJ-4 **Transmission and hydraulic lubricant** Kubota Super UDT 2 fluid **Front axle lubricant** SAE 90 gear oil **Total time engine was operated** 8.5 hours

ENGINE: Make Kubota Diesel **Type** four cylinder vertical with turbocharger and air to air intercooler **Serial No.** 2DC1960 **Crankshaft** lengthwise **Rated engine speed** 2600 **Bore and stroke** 3.937" x 4.724" *(100.0 mm x 120.0 mm)* **Compression ratio** 17.5 to 1 **Displacement** 230 cu in *(3769 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element **Fuel cooler** radiator for pump return fuel **Exhaust** regenerative particulate filter integrated within a underhood muffler with a vertical outlet **Cooling medium temperature control** one thermostat

ENGINE OPERATING PARAMETERS: Fuel rate: 37.9 - 40.1 lb/h *(17.2 - 18.2 kg/h)* **High idle:** 2700 - 2800 rpm **Turbo boost:** nominal 9.7-11.2 psi *(67 - 77 kPa)* as measured 10.5 psi *(72 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *M9960D53965* **Tread width** rear 59.1" *(1500 mm)* to 75.2" *(1910 mm)* front 61.8" *(1570 mm)* to 65.7" *(1670 mm)* **Wheelbase** 88.6" *(2250 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Nominal travel speeds mph *(km/h)*** first 1.39 *(2.23)* second 1.63 *(2.62)* third 1.87 *(3.01)* fourth 2.27 *(3.66)* fifth 2.44 *(3.93)* sixth 2.87 *(4.62)* seventh 3.11 *(5.01)* eighth 3.75 *(6.04)* ninth 3.87 *(6.23)* tenth 4.62 *(7.43)* eleventh 5.54 *(8.91)* twelfth 6.09 *(9.80)* thirteenth 6.62 *(10.65)* fourteenth 7.21 *(11.60)* fifteenth 8.36 *(13.46)* sixteenth 9.89 *(15.92)* seventeenth 10.78 *(17.35)* eighteenth 12.74 *(20.50)* nineteenth 13.86 *(22.31)* twentieth 16,49 *(26.53)* twenty-first 17.09 *(27.51)* twenty-second 19.61 *(31.56)* twenty-third 20.35 *(32.75)* twenty-fourth 23.31 *(37.52)* electronically limited

HYDRAULIC PERFORMANCE

CATEGORY: II
Quick attach: None
OECD Static test — lift cylinders

Maximum force exerted through whole range:	6192 lbs *(27.5 kN)* (2 x 75 mm)	
	4698 lbs *(20.9 kN)* (2 x 65 mm)	
i) Sustained pressure of the open relief valve:	2837 psi	*(196 bar)*
ii) Pump delivery rate at minimum pressure and rated engine speed:	17.1 GPM	*(64.6 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	15.2 GPM	*(57.6 l/min)*
Delivery pressure:	2285 psi	*(158 bar)*
Power:	20.3 HP	*(15.1 kW)*

reverse 1.39 *(2.24)*, 1.70 *(2.73)*, 1.94 *(3.12)*, 2.29 *(3.68)*, 2.52 *(4.05)*, 2.95 *(4.74)*, 3.19 *(5.13)*, 3.83 *(6.17)*, 3.95 *(6.36)*, 4.70 *(7.56)*, 5.62 *(9.05)*, 6.18 *(9.95)*, 6.66 *(10.71)*, 7.38 *(11.88)*, 8.48 *(13.65)* 10.02 *(16.12)*, 10.91 *(17.55)*, 12.93 *(20.81)*, 14.06 *(22.63)*, 16.70 *(26.87)*, 17.39 *(27.98)*, 19.87 *(31.97)*, 20.57 *(33.10)* 23.57 *(37.93)* electronically limited **Clutch** multiple wet disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2205 engine rpm **Unladen tractor mass** 6545 lb *(2969 kg)*

NOTE 1: The manufacturer declares that the average time between active regenerations is 18 hours, while operated in Auto Regeneration Cleaning Mode, at rated speed, full load, under steady state conditions.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's 3 point lift of claim of 7275 lbs *(3300 kg)* with 2 x 75 mm lift cylinders. For the maximum power tests, the fuel temperature at the fuel filter was maintained at 138°F *(59°C)*.

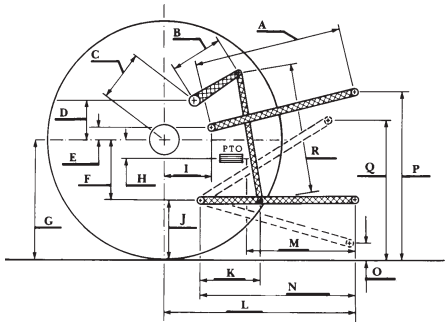
We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2065,** July 15, 2013.

Roger M. Hoy
Director

M.F. Kocher
P.J. Jasa
J.D. Luck
Board of Tractor Test Engineers

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	*mm*
A	29.1	*740*
B	11.0	*280*
C	12.0	*306*
D	11.3	*287*
E	11.3	*287*
F	9.3	*235*
G	28.4	*720*
H	0.3	*7*
I	10.4	*264*
J	19.1	*485*
K	16.3	*414*
L	38.6	*980*
M	23.8	*605*
N	31.3	*795*
O	9.1	*230*
P	43.1	*1095*
Q	34.1	*865*
R	24.4	*620*



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